

Health Effects of Exposure to Beryllium

This fact sheet provides information on the primary health effects associated with exposure to beryllium and emphasizes using medical screening to identify beryllium disease in workers. Please see OSHA's InfoSheet on [Beryllium Safety in the Workplace](#) for information on how to minimize exposures to beryllium and OSHA's [Beryllium Safety and Health Topics webpage](#).

Beryllium is a lightweight metal used primarily in alloys to add strength, thermal stability and other properties valued in the aerospace and defense industries. Workers can develop adverse health effects from breathing beryllium in dust, mist, fumes, or in other forms, or through skin contact with beryllium particulate, fumes, or solutions. Employers **must** reduce exposure to this toxic substance to or below the OSHA permissible exposure limit (PEL) of 2.0 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) averaged over 8 hours through feasible engineering and work practice controls. Employers **must** also provide workers with adequate personal protective equipment (PPE) to prevent skin contact with beryllium particulate, fumes, or solutions. See OSHA's Beryllium Safety in the Workplace InfoSheet for examples of appropriate PPE for working with beryllium.

OSHA recently issued a Notice of Proposed Rulemaking for beryllium that proposes to reduce the PEL for beryllium to $0.2 \mu\text{g}/\text{m}^3$ averaged over 8 hours along with additional provisions such as medical screening and surveillance to protect workers exposed to beryllium.

Chronic Beryllium Disease (CBD) is a chronic granulomatous lung disease caused by inhalation of airborne beryllium by individuals who have been previously sensitized to beryllium (see below). Workers can develop chronic beryllium disease (also known as berylliosis) from exposure to airborne beryllium even at levels below the current OSHA PEL of $2 \mu\text{g}/\text{m}^3$. CBD signs and symptoms can include shortness of breath, an unexplained cough, fatigue, weight loss, fever, and night sweats. Some workers with CBD may develop severe symptoms very quickly that become fatal, while others may not experience signs and symptoms until months or years after their exposure to

Occupations with Potential Exposure to Beryllium (Be) include:

- Be Metal/Alloy Production Workers
- Be Oxide/Ceramics Production Workers
- Foundry Workers
- Machinists and Machine Operators
- Metal Fabricators
- Welders
- Dental Technicians
- Abrasive Blasters (slags)

beryllium. CBD can continue to progress even after a worker has been removed from exposure. CBD is a chronic obstructive lung disorder that may adversely affect quality of life and shorten life expectancy. Sarcoidosis, a granulomatous lung disease of unknown cause or origin, has similar signs and symptoms with CBD that may make diagnosing CBD difficult without a record of occupational beryllium exposure.

Beryllium sensitization is the activation of the body's immune response to beryllium. Beryllium sensitization can result from inhalation or skin exposure to beryllium. Sensitization alone rarely results in noticeable symptoms. An individual must become sensitized to beryllium before he or she can develop CBD.

Lung cancer is associated with occupational exposure to beryllium by inhaling beryllium-containing dust, fumes or mist. The International Agency for Research on Cancer (IARC) lists beryllium as a Group 1 carcinogen (causes cancer in humans), and the National Toxicology Program (NTP) lists beryllium as a known human carcinogen.

Medical Screening and Surveillance

Workers with potential exposure to beryllium should participate in medical screening and surveillance as recommended by a medical professional with expertise in occupational exposure to beryllium and related health effects.

Medical screening — Medical screening should include a beryllium lymphocyte proliferation test (BeLPT) and may include biopsy by fiber optic bronchoscopy, X-ray, CT scan or positive blood or bronchoalveolar lavage BeLPT. BeLPT is a recognized blood test for measuring the immune response to beryllium in order to diagnose beryllium sensitization. Beryllium-specific lymphocyte proliferation in an individual's peripheral blood sample indicates an abnormal immune response and beryllium sensitization. Workers sensitized to beryllium are at risk for developing CBD and need continuing medical follow-up. CBD is diagnosed when medical screening identifies a beryllium exposure history and characteristics in the lung that indicate CBD.

Medical surveillance — is the systematic collection and analysis of health information on a group of workers. Medical surveillance programs provide for early identification and treatment for health effects and feedback to employers and employees that sensitization and/or CBD has occurred. If sensitization and/or CBD are identified, the employer should evaluate workplace controls to reduce or eliminate the exposure. For more information, see [OSHA's Medical Screening and Surveillance Safety & Health Topics webpage](#).

Treatment

There is no known cure for CBD. Treatment may include corticosteroids, oxygen, and other means to ease symptoms or slow the disease progression. For more information, see the National Institute for Occupational Safety

and Health's [Workplace Safety and Topics – Beryllium](#) webpage; National Jewish Medical and Research Center's [Chronic Beryllium Disease Treatment](#) webpage; the Agency for Toxic Substance and Disease Registry's [ToxFAQs for Beryllium](#) webpage; and the Department of Energy's [Chronic Beryllium Disease Prevention Program](#) webpage.

Workers' Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see [OSHA's Workers page](#).

How to Contact OSHA

For questions or to get information or advice, to report an emergency, fatality, inpatient hospitalization, amputation, or loss of an eye, or to file a confidential complaint, contact your nearest OSHA office, visit www.osha.gov or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



www.osha.gov (800) 321-OSHA (6742)



U.S. Department of Labor